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## 1,2,3-Trichloropropane (1,2,3-TCP)

CAS No. 96-18-4

### What is 1,2,3-Trichloropropane?

1,2,3-Trichloropropane (1,2,3-TCP) is a synthetic chemical (no natural occurrence), that is clear, more dense than water (1.389), relatively insoluble in water (1.75 g/L), and has a strong, sweet, acid odor. 1,2,3-TCP breaks down when exposed to sunlight and has a half-life of 15 days when exposed to the atmosphere. 1,2,3-TCP has not been found to adhere to soil particles or bio-accumulate in plants or animal tissue.

### History and Uses

1,2,3-TCP is used primarily as an industrial solvent, paint/varnish remover, degreaser, and in the production of other chemicals like liquid polymers and Dichloropropene (soil fumigant). The annual production of 1,2,3-TCP was estimated to be 21 to 110 million pounds in 1977. 1,2,3-TCP is not common in the environment, but has increasingly been found in surface waters, ground water, drinking water and at some hazardous waste sites.

### Toxicology

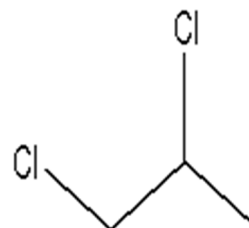
Exposure to 1,2,3-TCP has been found to occur via inhalation, ingestion, and absorption. Exposure rates via these routes are currently under study. Inhalation of 1,2,3-TCP at 100 ppm caused respiratory irritation. This effect was also observed in some study participants at 50 ppm. Studies performed using rodents indicate that 1,2,3-TCP inhalation may impair central nervous system (CNS) function and may be lethal at higher doses. Ingestion and dermal contact at high concentrations has been found to cause liver and kidney damage. Human carcinogenesis is undetermined, though chronic exposure has been positively correlated with tumor growth in animals.

### Regulation

The OSHA has established a 50 ppm 8-hour exposure limit of 1,2,3-TCP. On 10/01/2002, the EPA-Region IX Preliminary Remediation Goal (PRG) was 0.0056 µg/L. Based on a 10e-6 Cancer risk, the State of California Department of Health Services (DHS) maintains an Action Level (AL) of 0.005 µg/L.

## Analytical Methodology and Technology

### Scope



Important Information

Molecular Formula C<sub>3</sub>HCl<sub>3</sub>

Molecular Weight 133.44

EPA Region IX  
PRG (tap water) 0.0056 µg/L

DHS Action Level 0.005 µg/L

DHS Detection Limit  
for Purposes of  
Reporting (DLR) 0.005 µg/L

Calscience  
Reporting Limit  
(RL) 0.005 µg/L

Calscience Method  
Detection Limit  
(MDL) 0.005 µg/L

### SAMPLE COLLECTION

**CONTAINER:** Water samples should be collected into 100 ml VOA vials.

**PRESERVATION:** Samples should be preserved with HCl and kept chilled above 4°C but ≤ 6°C.

**HOLDING TIME:** All samples must be analyzed within 30 days of collection.

**LABORATORY CONTACT:** For further information on laboratory capabilities, call Marycarol Valenzuela or Bob Stearns at (714) 841-8800.

The determination of 1,2,3-TCP is applicable to ground and drinking water using a modified version of USEPA Method 524.2 (Purge and Trap, Gas Chromatography/Mass Spectrometry).

### Procedure

Analysis is performed using purge and trap and GC/MS. 1,2,3-TCP is positively identified by matching the retention time and fragment ions of compounds in the sample with those of the reference standard. Quantitation is performed by isotopic dilution. 1,2,3-Trichloropropane-<sub>ds</sub> (1,2,3-TCP-<sub>ds</sub>) is used as the internal standard, and is added at the same concentration to the samples and standards. Calscience performed an MDL study at a concentration of 5 ng/L (ppt) with a resulting standard deviation of 0.258 and a calculated MDL of 0.811 ng/L (ppt). The DHS established a Detection Limit of Reporting (DLR) at 5 ng/L (ppt).

### Interferences

Due to the extreme sensitivity of the method, even low abundances of co-eluting ions of similar mass may result in significant interference. Such interferences may vary depending on the column/system. The following compounds have been documented to cause positive interference; trans-1,4-Dichloro-2-butene (m/z 75 ion), Isopropylbenzene (m/z 75 ion), and o-Xylene (m/z 79 ion).

